Chapter 3

TESTING OF 24-VOLT D.C. GENERATOR SYSTEMS

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Introduction

1. This chapter describes the nominal 24-volt d.c. generator systems in general use on Service aircraft, the tests necessary as a final performance check, and the installation arrangements for making such tests.

Generator systems

2. Three types of generator systems are likely to be encountered:—

(1) Single generator systems.

(2) Two or more generators running in parallel and controlled by matched regulators, or by matched regulators and a common master regulator.

(3) Two or more generators running in parallel and stabilized by an equalizer busbar. The generator, Type 501, with voltage regulator, Type 57, is an example of this type of regulation, which will be used generally on future aircraft using 24-volt d.c. generators as the primary power supply.

Testing procedure

3. The tests made on generators and their ancillary equipment vary according to the class of aircraft, but in general take the following form:—

(1) A bench test prior to installation, to ensure correct settings and functioning of the equipment.

(2) A ground test after installation in the aircraft.

(3) A test under airborne conditions (where possible).

4. Test (1) is a standard workshop test and is common to all Units. This form of testing is used to check the performance of new equipment before installation, or to check performance of items of equipment that have been serviced.

5. The method of ground testing (2) varies according to the class of aircraft. A ground test can either be a full test conducted preparatory to flight, or a reasonable check preparatory to a flight test. Full ground tests are conducted on single-seater aircraft, or on aircraft where flight tests are inconvenient.

6. A flight test (3) is conducted on the larger types of aircraft.

7. On each system the following checks should be made:—

(1) That the regulator is set to give the correct voltage.

(2) That the cut-out closes within ± 2 volts of the specified figure.

Note . . .

On multi-generator installations it should not be necessary to check the circulating current between the generators, provided the voltage

regulators have been set correctly. Under no circumstances should the value of circulating current or load sharing between generators be interfered with.

Test facilities

8. On earlier types of aircraft, current readings are obtained by the removal of a fuse or opening of a circuit breaker, a suitable meter being connected across the opened fuse or circuit breaker contacts.

9. Readings of voltage can be taken between the positive generator line and negative or earth. The voltmeter should be connected on the bus-bar side of the regulator and cut-out.

10. Some other early types of aircraft are equipped with two test sockets for each generator, one connected across an ammeter shunt, and the other, which is used for voltage measurements, connected between the generator positive line and negative or earth. A relay is provided so that any generator may be isolated from the common bus-bar (*para.* 14).

11. Test readings are generally taken with a testmeter, Type D (Stores Ref. 10S/10610), but an ammeter, 50–0–200 (Stores Ref. 5Q/4340), may be available at some Units; this ammeter is normally used in conjunction with a 200-amp. shunt. If, however, a 100-amp. shunt is in circuit, the meter reading must be divided by two.

12. At present there are two shunts in use, a 200-amp. and a 100-amp.; both shunts are designed for a 50-millivolt drop across them at their rated current. The 15-milliamp. range of the testmeter, Type D, requires 50 millivolts for full-scale deflection of the pointer, so that a reading of 150 or 75 on the top two scales will correspond to a current of 200 amp. with a 200-amp. shunt, or 100 amp. using a 100-amp. shunt.

13. To convert the reading obtained on a Type D testmeter, set on the 15 milliamp. range:—

(1) With a 200-amp. shunt, multiply the reading on the 150 scale by 4/3, or readings on the 75 scale by 8/3.

(2) With a 100-amp. shunt, multiply the reading on the 150 scale by 2/3, or readings on the 75 scale by 4/3.

14. It is important to note that readings of generator current observed on any meter connected to the ammeter 2-pole socket will give an indication of current value only. The reading will be far from accurate owing to the resistance of the leads and fuses connected between the shunt and the ammeter socket. An accurate reading of the total generator current is not normally required, but if such a reading is necessary for any reason, the meter must be connected to the shunt with short leads and without fuses, or, in the case of the Type D testmeter, by connecting the meter to the shunt with the leads provided.